ORD PFAS Activities

Last updated: **March 27 2018**

This master list is an inventory of all known ORD projects or activities which touch upon PFAS chemicals, including those where PFAS might be only a small part of the project. Much of this work was initiated before the current era of heightened Agency interest in PFAS, developed either within the ORD Research Action Plans (RAPs) or initiated as collaborative opportunities and needs presented themselves, e.g. via university collaborations or requests for assistance from States and EPA Programs and Regions.

As such, this inventory is not intended to represent a strategic, integrated program of R&D work related to PFAS.
A subset of higher priority work from this inventory will form the core of such an integrated strategy, to be captured in an ORD PFAS Action Plan currently under development.

Activities are organized and numbered by Category of Work.

Shading Key:
= need Lead Org to validate
= potential project, in discussion, not yet active

Identifier	Program	R&D Category	Lead Org	POC	Other Orgs	Project Name	Project Description	Deliverable	Estimated Date of Completion	Latest POC comments	In Biweekly Updates?	In ORD Action Plan?
1.01	SSWR	Laboratory Methods	Cross-Agency Method Validation Workgroup	Chris Impellitteri	OLEM, R3, OW, NERL	Drinking water methods	Analytical method development/validation for selected short-chain or "new" PFAS under EPA Method 537 v1.1	Validated drinking water method (for potential use in UCMR)	Jun-19	Reviewed; edits made per NERL	Yes	Yes
1.02	SSWR	Laboratory Methods	Cross-Agency Method Validation Workgroup	Chris Impellitteri	OLEM, R3	SW-846 non-drinking water methods	Analytical method development/validation for selected PFAS under SW-846 (non-dw matrices)	Validated direct injection method for non-drinking water	Oct-18	No changes needed	Yes	Yes
1.03	SSWR	Laboratory Methods	Cross-Agency Method Validation Workgroup	Chris Impellitteri	OLEM, R3	SW-846 non-drinking water methods	Analytical method development/validation for selected PFAS under SW-846 (non-dw matrices)	Validated isotope dilution method for non-drinking water	Feb-19	No changes needed	Yes	Yes
1.04	SSWR	Laboratory Methods	Cross-Agency Method Validation Workgroup	Chris Impellitteri	OLEM, R3	SW-846 solids method	Analytical method development/validation for selected PFAS under SW-846 (solid matrices)	Validated method for solids	Jun-19	No changes needed	Yes	Yes
1.05	SHC	Laboratory Methods	NRMRL	Tom Speth	Region 1, 2, 5, 10, POs,	Characterizing PFAS contamination with methods to quantify precursors and perfluoroalkyl acids (PFAAs) in water and solids	Develop methods to measure PFAS chemicals in the environment and collect data to characterize PFAS sources and contaminated sites. This project also includes RARE and STL funded projects to respond directly to Regional priorities.	ORD and EPA SOPs	Ongoing	Reviewed; edits made		Yes
1.06	CSS	Laboratory Methods	NERL	Tim Buckley / Mark Strynar		Validation of laboratory method for GenX in waste, surface, and drinking water	Laboratory studies establishing acceptable recovery, sensitivity, and precision for quantification of GenX (and related ether carboxylic acids) in waste, surface, ground, and drinking waters	Peer-reviewed journal articles	Q3 FY18	Reviewed; edits made (note that one GenX detection paper was published in Nov. 2016); date from NERL exposure research strategy		
1.07	CSS	Laboratory Methods	NERL	Tim Buckley / Jody Shoemaker / Steve Wendelken	OW/OGWDW	Update of Method 537	Method 537 is being updated to include language from the 2016 Drinking Water Technical Advisory on PFOA. This does not involve any lab work or multi-lab verification but peer-review will be conducted.	Updated Method 537	FY2019	Reviewed; project added		Yes
1.08	CSS	Laboratory Methods	NERL	Tim Buckley / John Washington		Use of stable isotopes in nontargeted analyses to identify anthropogenic chemicals	Numerous sample types are being analyzed using nontargeted analyses to determine whether stable isotopic ratios might be useful for identification of unknown PFAS and other anthropogenic compounds in natural matrices	Peer-reviewed journal article	FY18 Q4	Reviewed; project added		Yes
1.09	CSS	Laboratory Methods	NCCT	Reeder Sams	N/A	PFAS Screening Library	Procurment and compilation of approximately 400 different PFAS for use in Tier I toxicity testing and other research activities	PFAS samples	Apr-18	No changes needed	Yes	
1.10	SSWR	Laboratory Methods	NHEERL	Ron Hines		Method for detecting PFAS in marine matrices	Development of an SOP for measuring PFAS in marine media	Management and QA approved SOP	18-Mar	Completed Mar 5, 2019	Yes	Yes
1.11	N/A	Laboratory Methods	NERL	Tim Buckley/Jeff Ryan	NRMRL, OAQPS, R1, NH, R4, NC	Methods development for measuring PFAS in air (stack and ambient)	Working with R1 and R4 to investigate stack emissions, transport and deposition as pathway for regional PFAS contamination. In both regions, this work is an extension of prior work involving water and/or soil analysis. The air work will provide qualitative results rather than quantitative and will entail the application of non-targeted analysis.	Data report from R1 stack sampling.	FY18 Q4			Yes
2.01	SSWR/SHC	Exposure	NRMRL	Tom Speth	Regions, States, Municipalities, Tribes, PO's	PFAS occurrence and fate in environment	Evaluate the ocurrence fate of legacy and next generation PFAS being found in surface waters, groundwaters, sediments, soils, air, etc. Analytical chemistry, passive samplers, bioassays, and other innovative measures are being developed to characterize PFAS in the environment.	This is the compilation of projects and will produce manuscripts and reports.	Ongoing	Reviewed and edits made	Yes	Yes
2.02	N/A	Exposure	NERL	Tim Buckley / Mark Strynar	NIEHS R21 funded grant to NCSU	The "GenX Exposure Study" assesses the impact of drinking water exposure to GenX in the Cape Fear River Basin, North Carolina	Study aims include: 1) Community engagement and interaction to ensure community needs are addressed throughout the study; 2) Characterize human exposure to GenX in the lower Cape Fear Region; and 3) Perform clinical chemistry tests in blood and evaluate whether these are altered in the presence of GenX exposure	Peer-reviewed journal articles	Q4 FY2018 & FY2019	Reviewed; edits made	Yes	
2.03	N/A	Exposure	NERL	Tim Buckley / Andy Lindstrom	OSU	Investigation of expanded PFAS chemical manufacturing impact to soil and surface water along the Ohio River due to air release	Three rounds of field sampling and analysis summer and fall of 2016, OSU led study with EPA providing laboratory support and study design consultation and mentoring	Peer-reviewed journal article	May-18	Reviewed; edits made	Yes	

2.04		N/A	Exposure	NERL	Tim Buckley / Andy Lindstrom	R2, NJ DEP	Detection, evaluation, and assignment of multiple PFAS in environmental media from an industrialized area of New Jersey	Study objectives include confirmation of ongoing surface and groundwater contamination from current and historical source discharges, establishing specific PFAS source signatures originating from different industrial sites, and an evaluation of the potential for regional air deposition impacts	Data report to NJ and Region 2 partners (June 2018) and peer-reviewed journal article(s) (FY2019 Q1)	June 2018; Q1 FY19	Reviewed; edits made	Yes	
2.05		CSS	Exposure	NERL	Tim Buckley / Mark Strynar	NCCT, NHEERL, NIEHS	Non-targeted analysis to identify and screen novel PFAS for additional study	Laboratory methods relying on high-resolution mass spectrometry and work flow processes (aka non-targeted or suspect screening) are being developed to help identify and prioritize novel PFAS in environmental and human biological samples for further toxicology or exposure study	Journal articles	2015, 2016, 2017, 2018	Reviewed; project added		Yes
2.06		N/A	Exposure	NERL	Tim Buckley / John Offenberg	NRMRL, R2, R1, NH, NJ, NC, OAQPS	PFAS air monitoring methods and measurements	Laboratory testing is being conducted to evaluate integrated and direct-reading high-resolution mass spectrometric methods of sampling and analysis for stack and ambient monitoring	Journal articles	FY2019	Reviewed; project added	Yes	Yes
2.07		N/A	Exposure	NERL	Tim Buckley / John Washington	U. Toronto, OCSPP	Modeling PFAS Loads	Previously reported measurements of PFAS in soil and oceans are being used to estimate global PFAS loads. In turn, these loads are being used to infer fluorotelomer-polymer degradation rates necessary to generate these loads.	Peer-reviewed journal article	FY18 Q4	Reviewed; project added		
2.08		CSS	Exposure	NERL	Tim Buckley / Chris Mazur		Thyroid hormone cellular uptake in the presence of PFOA and PFOS chemical exposure	Method development for the assessment of cellular uptake of thyroxine (T4) in cryopreserved hepatocytes and the potential physiological implications associated with T4 displacement via PFOA/PFOS from the serum binding protein transthyretin.	Peer-reviewed journal article	FY18 Q4, FY19	Reviewed; project added		
2.09		CSS	Exposure	NERL	Tim Buckley / John Washington		Study of PFOA stability in soil	Unlabeled and 13C8-labeled PFOA has been incubated in soil for ~7 years with samples drawn periodicly for nontargeted analyses looking for evidence of PFOA degradation.	Depending on outcome of future analyses, possibly a journal article	Ongoing, depends on outcome of future analyses	Reviewed; project added		
2.10		N/A	Exposure	NERL	Tim Buckley / Mark Strynar	Duke	Pilot study of perfluoroalkyl levels in source and drinking water	This is a very small study (23 samples) led by Duke University (Heather Stapleton) with limited consultative support from EPA	NA	NA	Reviewed; project added		
2.11		N/A	Exposure	NERL	Tim Buckley	OLEM, ITRC	Exposure lit review and data analyses	Reviews/analyses covering multiple aspects of PFAS exposure, including and building upon reviews by OLEM and ITRC	Report?	Q2 FY18	From NERL exposure research strategy		
2.12		SHC	Exposure	NERL	Tim Buckley	OECA	Geospatial analysis	Develop integrated PFAS data repository & visualization tools	Maps	Q4 FY18	From NERL exposure research strategy		
2.13		SHC	Exposure	NERL	Tim Buckley		Geospatial analysis	Evaluate the use of EnviroAtlas as a geospatial visualization tool for understanding and characterizing human and ecosystem PFAS exposure scenarios	Report?	Q4 FY18	From NERL exposure research strategy		
2.14		ACE	Exposure	NERL	Tim Buckley		Air dispersion modeling	Evaluate use air dispersion modeling tools (e.g., AERMOD) for PFAS, including identification of key model inputs, parameters, and data gaps	Report?	Q2 FY18	From NERL exposure research strategy		
2.15		ACE	Exposure	NERL	Tim Buckley		Air dispersion modeling	Apply air dispersion modeling tool, with updated model input/parameters, to characterize air exposure pathway	TBD	TBD	From NERL exposure research strategy		
2.16		CSS	Exposure	NERL	Tim Buckley		Exposure modeling	Evaluate existing EPA human exposure modeling tools (e.g., Lorber/Egeghy model)	Report?	Q2 FY18	From NERL exposure research strategy		
2.17		CSS	Exposure	NERL	Tim Buckley		Exposure modeling	Develop and application multimedia exposure modeling approach/tool for PFAS, including possible source case scenarios such as (1) near fire training/fire response sites; (2) near industrial sites; (3) near landfills; (4) near Wastewater treatment plants/biosolids; (5) food consumption; (6) consumer products	TBD	TBD	From NERL exposure research strategy		Yes
2.18		N/A	Exposure	NERL	Tim Buckley/Karen Bradham		Leveraging DHHS American Healthy Homes Survey, ATSDR PEEAT Study	Potential exists to leverage planned ORD participation (for metals and mold) to include PFAS analysis. To be discussed with IOAA and NPDs					Yes
3.01		CSS	Toxicity Testing	NCCT	Reeder Sams	NHEERL, NERL, NCEA	Risk-based tox testing strategy: Tier 1	*In vitro* toxicological and toxicokinetic screening studies of approximately 75 PFAS	Screening data to be used in Tier 2	Oct-18	No changes needed	Yes	Yes
3.02		CSS	Toxicity Testing	NCCT	Reeder Sams	NHEERL, NERL, NCEA	Risk-based tox testing strategy: Tier 2	*In vivo* toxicological and toxicokinetic studies of potentially high-risk PFAS	TBD-Informed by Tier I testing and being performed by the National Toxicology Program	Apr-19	Reviewed; edits made	Yes	Yes
3.03		CSS	Toxicity Testing	NHEERL	Ron Hines	NERL	Pilot zebrafish study	Measurement of dose-dependent developmental toxicity and developmental neurotoxicity of seven candidate PFAS compounds in the zebrafish model and determination of internal dosimetery (Tamara Tal)	Data to inform concentration selection and to inform developmental neurotoxicity endpoint in Tier 1 studies (ID# 6). Peer reviewed journal article.	Apr-18	As of Mar-18, toxicity studies complete; internal dosimetry studies in progress	Yes	
3.04		SSWR	Toxicity Testing	NHEERL	Ron Hines		PFBS/mouse model	Toxicokinetics of perfluorobutane sulfonate (PFBS) in a rodent model (Jane Ellen Simmons)	Peer-reviewed journal article	Jun-18	Reviewed; edits made		
3.05		CSS	Toxicity Testing	NHEERL	Ron Hines		PFAS mixture/mouse model	Developmental toxicity of a perfluoroalkyl phosphonate chemical mixture commonly found in defoaming agents in pesticide production in a mouse model (Chris Lau)	Peer-reviewed journal article	Aug-18	Reviewed; edits made		
3.06		CSS	Toxicity Testing	NHEERL	Ron Hines		PFAS screening	Screening of 210 chemicals—five of which are PFAS—for their ability to activate or suppress sterol regulatory element binding protein (SREBP) and induce fatty liver disease in the mouse liver (Chris Corton)	Peer-reviewed journal article	Apr-18	Journal article cleared (including AN) and submitted to journal		

3.07		CSS	Toxicity Testing	NHEERL	Ron Hines		PFAS screening	Screening of 163 chemicals—including several PFAS—for their ability to activate both the constitutive activated receptor (CAR) and the Nrf2 signaling molecules (Chris Corton)	Peer-reviewed journal article	May-18	Reviewed; edits made		
3.08		CSS	Toxicity Testing	NHEERL	Ron Hines		PFAS screening	Using NHANES data, evaluate PFAS effects on iron homeostasis and tissue injury biomarkers	Peer-reviewed journal article	18-Aug	Study in progress		
3.09		CSS	Toxicity Testing	NHEERL	Ron Hines	NERL	GenX Reproductive and Developmental Tox	Evaluate capability of GenX to activate nuclear receptor signaling and to elicit developmental and reproductive toxicity (Earl Gray)	Peer-reviewed journal article	Aug-18	Much of the expertimental work complete, internal dosimetry in progress	Yes	
4.01		N/A	Hazard Characterization	Cross-Agency Human Health Toxicity Workgroup	Lynn Flowers	OLEM	Report on data availability for 31 selected PFAS	Summary of published toxicity and exposure literature related to approximately 31 PFAS	Human health toxicity values	TBD		Yes	Yes
4.02		HHRA	Hazard Characterization	NCEA	Samantha Jones		Toxicity Value - PFBS	Update existing PPRTV document for PFBS,	Peer reviewed toxicity assessment document	Jul-18		Yes	Yes
4.03		HHRA	Hazard Characterization	NCEA	Samantha Jones		Toxicity Value - 5 more	Develop de novo toxicity assessment documents for PFHxA, PFBA, PFDA, PFHxS, PFNA	Peer reviewed toxicity assessment documents	TBD		Yes	Yes
4.04		HHRA	Hazard Characterization	NCEA	Samantha Jones		Manuscript	Associations between serum perfluoroalkyl substance (PFAS) levels and measures of thyroid hormone, kidney function, and BMI in an exposed U.S. population.	Manuscript	Sent to Journal Feb-18	Recently completed Advanced notification process, cleared for journal submission.		
5.01		SSWR	Drinking Water Treatment	NRMRL	Tom Speth		Drinking water treatability	Bench- and pilot-scale studies of drinking water treatment technologies	(Milestone: Briefing to management on preliminary results by 9/2018) Final product: Manuscript	Sep-19	Reviewed; edits made	Yes	Yes
5.02		SSWR	Drinking Water Treatment	NRMRL	Tom Speth	WRF, DoD	Drinking water treatability	Review and synthesis of available literature related to drinking water treatment of PFAS	Updated EPA Treatability Database with available PFAS information	Sep-18	No changes needed	Yes	Yes
5.03		SSWR	Drinking Water Treatment	NRMRL	Tom Speth	AFIT	Drinking water treatability	Develop cost models to specifically address PFAS (Note: additional comparison to DOD cost models June 2019)	Peer-reviewed cost models (GAC, ion exchange, membranes)	Jun-18	Reviewed; edits made	Yes	Yes
5.04		SSWR	Drinking Water Treatment	NRMRL	Tom Speth	R5, R8	RARE Project - PFAS removal effectiveness in homes	Quantify the ability of commerically available point-of-entry devices to remove select PFAS	Manuscript that describes study parameters and outcomes along with findings and recommendations for development of operation and maintenance procedures to achieve PFAS removal rates identified during the study	Dec-18	Reviewed; edits made	Yes	Yes
6.01		SSWR/SHC	Remediation	NRMRL	Tom Speth	Regions, States, Municipalities, Tribes, PO's	PFAS fate during wastewater treatment and receiving waters	Evaluate the ocurrence and fate of legacy and next generation PFAS being managed by current and advanced wastewater treatment process	This is the compilation of 4-6 projects and will produce manuscripts and reports.	Ongoing	Reviewed and edits made	Yes	Yes
6.02		SSWR/SHC	Remediation	NRMRL	Tom Speth	Regions, States, Municipalities, Tribes, PO's	PFAS fate during management of biosolids	Evaluate the ocurrence fate of legacy and next generation PFAS being managed during biosolids treatment e.g. land application, composting.	This is the compilation of 2-3projects and will produce manuscripts and reports.	Ongoing	Reviewed and edits made	Yes	Yes
6.03		SHC	Remediation	NRMRL	Tom Speth	Regions, States, Municipalities, Tribes, PO's	Evaluating site remediation and treatment technologies for PFAS contaminated sites	Evaluating treatment technologies for implementing treatment train approaches to manage PFAS contaminated sites. Also, addresses how PFAS moves through urban and rural soils, using an unsaturated zone hydrologic model (HYDRUS2D), best-known published physicochemical and partitioning parameters, and well-characterized urbanized soil hydrology. Finally, it accounts for work on the impact of atmospheric transport.	This is the compilation of 2-3projects and will produce manuscripts and reports.	Ongoing	Reviewed and edits made	Yes	Yes
6.04		SHC	Remediation	NRMRL	Alice Gilliland	R2	Identification of immobilization technologies for PFAS contamination in soil	Identify a remediation approach that is capable of immobilizing PFAS in soils and other contaminated matrices	Recommendations for remedies based on results; reports, engineering issue papers for dissemination that provides a data comparison of the performance of commercially available sorbents to promising literature sorbents to stabilize PFAS, specifically PFOS and PFOA in source area soils; peer-reviewed journal article	Dec-19	Reviewed; edits made		Yes
7.01		N/A	Technical Support	NERL	Tim Buckley / Mark Strynar	R4, NC DEQ	Technical Support - GenX/Cape Fear	We have responded to NC DEQ/R4 request for assistance to quantify legacy and novel PFAS in waste, well, surface, and drinking water along the Cape Fear River	Seven data reports (July 13 - Nov 9, 2017); peer review journal article March 2018	Mar-18	This project captures the Tech Suport that is on-going to POs, Regions, States, Tribes, Communities, etc	Yes	Yes
7.02		N/A	Technical Support	NERL	Tim Buckley / Andy Lindstrom	R1, NH	Technical Support - New Hampshire (textile manufacturig facility)	NERL is providing laboratory support for the analysis of PFAS (legacy and novel) in water, char from stacks, soil, and dispersion samples. NHDES will use results to identify PFAS for analysis by commercial labs. Consideration is being given for lab support to evaluate stack emissions and ambient air concentrations over concerns of air transport and deposition.	Data reports and peer-reviewed journal articles	Spring 2018 and FY19	This project captures wastewater research being conducted under on occurrence and fate of PFAS during conventional and advanced wastewater treatment	Yes	Yes

7.03	N/A	Technical Support	NERL	Tim Buckley / Andy Lindstrom	R1, Maine	Technical Support - Maine	Data from ME is being review and state needs relative to NERL capabilities are being explored	TBD	Ongoing	This project captures wastewater research being conducted under on occurrence and fate of PFAS during conventional and advanced wastewater treatment	Yes	Yes
7.04	SHC/SSWR	Technical Suport	NRMRL	Tom Speth	Regions, States, Municipalities, Tribes, PO's	Technical support for PFAS in Drinking Water and Contaminated Site Remediation	OLEM, OW, Regions, States, Tribes, Communities, etc. Technical Support to provide answers to common and reoccurring technical support inquiries from site managers, enabling them to take advantage of the latest scientific knowledge regarding PFAS.	Report	Ongoing	Reviewed and edits made	Yes	Yes
8.01	N/A	Communications	OSP	Lisa Matthews	ECOS, ASTHO	Pilot risk communication project	ECOS and ASTHO are identifying and evaluating existing risk communication toolkits, including one developed by ATSDR	Webinar and case study fact sheets	Jun-18	No changes needed	Yes	Yes
8.02	N/A	Communications	OSP	Lisa Matthews	ECOS	Bimonthly calls with ECOS on PFAS topics of interest to ECOS	ORD convenes bimonthly calls with ECOS on PFAS topics of interest to ECOS. Some presentations by EPA staff, some by ECOS members	Ongoing	Ongoing	This project captures research being conducted to evaluate occurrence and fate of PFAS during conventional and advanced wastewater treatment		Yes
8.03	N/A	Communications	IOAA	Lahne Mattas-Curry	OW	Serve as POC for all ORD PFAS-related communuications	Creation of a portal to all PFAS related information to enable external stakeholders to access EPA information. Part of Administrators Action Agenda	New web site	Mar-18	The project captures a RARE project with Reg 10 and other immobilization technologies. The estimated date of completion is for this RARE project, other work will continue.		Yes
9.01	SSWR	Other	NCER	Mike Hiscock	OW, OCSPP	Congressional National Priority/Request for Applications/PFAS	To better understand the water quality and availability challenges of PFAS, EPA is seeking grant applications that generate new information for nationally assessing PFAS fate and transport, exposure, and toxicity. This RFA will inform new strategies that protect public health and the environment from PFAS exposure and adverse outcomes.	One or more external grants funded	Oct-18			N

Research Category	Lead Org	POC	Other Orgs	Project Name
Laboratory Methods	NHEERL	Ron Hines		Analytical methods for marine matrices
Technical Support	NRMRL	Alice Gilliland	R10	Technical Support - Naval Air Station Whidbey Island, WA
Technical Support	NRMRL	Alice Gilliland	R10	Technical Support - Fairchild Air Force Base in Spokane County, WA

Project Description	Deliverable	Estimated Date
Analytical method development for PFAS in seawater	Method SOP	Completed (Nov 2017)
Supporting site characterization at six military installations where aqueous film forming foam (AFFF) has impacted groundwater	Document review	Completed
Supporting site characterization at six military installations where aqueous film forming foam (AFFF) has impacted groundwater	Document review	Completed